

M E M O R A N D U M
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

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SUBJECT: Guidance Memo No. 05-2001 - Final 316(b) Phase II Rule Implementation

TO: Regional Directors, Regional Water Permit managers

FROM: Ellen Gilinsky, Ph.D., Director



DATE: January 21, 2005

COPIES: Rick Weeks, Jon Van Soestbergen

Summary:

The purpose of this guidance is to describe a new Clean Water Act Section 316(b) rulemaking by EPA, how it will affect VPDES permitting procedures, and what steps DEQ must take in order to implement this rule.

Electronic Copy:

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET and for the general public on DEQ's website at: <http://www.deq.virginia.gov>

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Please contact Mike Gregory, Office of Water Permit Support, (804) 698-4065 or mbgregory@deq.virginia.gov if you have any questions about this guidance.

Disclaimer:

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Final 316(b) Phase II Rule Implementation

Background:

On July 9, 2004 EPA published the final Phase II rule, effective September 7, 2004, that establishes location, design, construction and capacity standards for cooling water intake structures at large power plants. This rule was developed in response to Section 316(b) of the Clean Water Act which requires that EPA ensure water intake structures reflect the best technology available to protect aquatic organisms from being killed or injured by impingement (being pinned against screens or other parts of a cooling water intake structure) or entrainment (being drawn into cooling water systems and subjected to thermal, physical or chemical stresses). EPA divided this rulemaking into three phases: Phase I addresses new facilities and was completed in December 2001. Phase II applies to existing electric generating plants that withdraw 50 million gallons per day or more and use at least 25 percent of the withdrawn water for cooling purposes. Phase III, currently in proposed status, will apply to other industrial sectors. The remainder of this memo will pertain to the Phase II rule.

Most impingement and entrainment impacts are to early life stages of fish and shellfish. When the quantity of water withdrawn is large relative to the flow of the source waterbody, more organisms are affected. Intakes in coastal waters, estuaries, and tidal rivers tend to have greater ecological impacts than those in freshwater lakes and offshore ocean intakes, since these areas are usually more biologically productive and have more aquatic organisms in early life stages. The new EPA rule requires protection against these losses. Impingement requirements call for the number of organisms pinned against parts of the intake structure to be reduced by 80 to 95 percent from uncontrolled levels. Entrainment requirements call for the number of aquatic organisms drawn into the cooling system to be reduced by 60 to 90 percent from uncontrolled levels. The rule allows the affected power plants flexibility in achieving compliance in order to ensure energy reliability. It provides several compliance alternatives, such as using existing technologies, selecting additional fish protection technologies, and using restoration measures.

Though the rulemaking pertains to intake structures, it is to be implemented with NPDES discharge permits, so there will be an impact to 316(b) requirements in our VPDES program.

Virginia Phase II Facilities:

Given the applicability criteria of the Phase II rule, it will apply to the following Virginia facilities and will thus impact these eight VPDES permits.

<u>Facility Name</u>	<u>Permit No</u>	<u>Region</u>	<u>Expiration</u>
Dominion Virginia Power - Chesterfield	VA0004146	PRO	03/27/02
Dominion Virginia Power - Bremo	VA0004138	VRO	08/06/05
Dominion Virginia Power - Chesapeake	VA0004081	TRO	12/05/05
Dominion Virginia Power - North Anna	VA0052451	NVRO	01/11/06
Dominion Virginia Power - Yorktown	VA0004103	TRO	03/02/06
Dominion Virginia Power - Possum Point	VA0002071	NVRO	09/13/06
Dominion Virginia Power - Surry	VA0004090	PRO	11/02/06
APCO - Glen Lyn	VA0000370	WCRO	07/11/09

Permittee Requirements:

Before compliance with the new performance standards can take place the power plants have to conduct studies and submit the results to establish baseline conditions at the intakes, the site specific standard that will apply and the compliance alternative that will be chosen. Other information is required depending on the alternative. The information to be submitted is mainly in the form of what is called a "Comprehensive Demonstration Study". This and other 316(b) related application materials would normally be due with the application for reissuance, but in consideration of the time required to develop this information the rule allows for extension requests for permits that expire within four years of rule publication. All of the listed Virginia VPDES permits except APCO - Glen Lyn, which was just reissued, fall into this category and extensions have been granted. The Dominion Virginia Power VPDES permits will have deadline dates for submittal of the Comprehensive Demonstration Study set by the EPA rule rather than determined by expiration date. This final date is January 7, 2008.

The information to be submitted by the above deadline is listed in abbreviated form as an attachment to this guidance memo (Attachment I). The exact requirements are listed at 40 CFR Part 122.21(r)(2), (3) and (5), and in 40 CFR Part 125.95.

After the information requirements are satisfied and 316(b) requirements and applicable performance standards are incorporated into the VPDES permit the permittee must implement the chosen compliance alternative and demonstrate compliance by monitoring in accordance with 40 CFR Part 125.96, and by submitting reports in accordance with 40 CFR Part 125.97.

DEQ Requirements:

DEQ Office of Water Permit Programs (OWPP) will amend the permit regulation to reflect the new federal requirements.

DEQ OWPP and the regional offices affected will review and provide comment on the two information submittals described below:

1. The Proposal for Information Collection (PIC) is a part of the Comprehensive Demonstration Study that will have to be submitted in advance of the rest of the study since it must be reviewed by the permitting authority prior to the data collection activities necessary to develop the study. Therefore, the original submittal of a PIC will be independent of permit reissuance processing, and the PIC will be the first item that will require review. It is anticipated that an expeditious review will be necessary and that fisheries expertise will be helpful, so a committee has been established to review the PICs that includes representatives from DEQ, the Department of Game and Fisheries, and the Virginia Marine Resources Commission (see attached list, Attachment II). OWPP will coordinate comments and send them to the permittee.
2. The Comprehensive Demonstration Study will be the next 316(b) related submittal, and it is to be submitted by the rule established date that will be incorporated into the permit by special condition (see below). Review and acceptance of the study will be by the regional office reissuing the VPDES permit for that facility, with support from OWPP.

Once the Comprehensive Demonstration Study is reviewed and accepted, the appropriate 316(b) requirements and applicable performance standards will be determined and incorporated into the VPDES permit by the regional office during reissuance or upon reopening the permit. The Comprehensive Demonstration Studies will be due during the five year term of the next permit cycle after this current term. The timing of the Comprehensive Demonstration Study acceptance with the permit's next permit expiration date must be considered in deciding if the permit should be reopened rather than waiting for reissuance. After the original inclusion of the requirements in the permit, application materials and monitoring data must be reviewed at each reissuance to determine if any further changes are necessary.

VPDES Permitting Procedure – Next Reissuance:

Since extensions for information submittals have been granted to all of the facilities not recently reissued, and these facilities have expiration dates before the January 7, 2008 deadline, the next permits that are written need only contain a schedule for submission of the information. The following special condition is recommended:

"As required by federal regulation at 40 CFR Part 122.21(r) (2004) the permittee shall submit 316(b) related application materials for a Phase II existing facility in accordance with 40 CFR Part 125 Subpart J (Requirements Applicable to Cooling Water Intake Structures for Phase II Existing Facilities Under Section 316(b) of the Clean Water Act)(2004), including any applicable portions of the Comprehensive Demonstration Study as appropriate for the facility intake structure compliance alternative, as expeditiously as practicable but not later than January 7, 2008. A progress report on development of the Comprehensive Demonstration Study shall be submitted annually by January 10 until the study is submitted. The permittee shall submit a Proposal for Information Collection for the above Comprehensive Demonstration Study prior to the start of information collection activities. All submittals shall be made to the Regional Office."

Once the VPDES Permit Regulation is updated the federal citations in the above special condition can be changed to the appropriate VAC reference.

In the next reissued (or reopened) permit after submittal of the Comprehensive Demonstration Study the permit must contain the appropriate cooling water intake structure requirements, monitoring conditions, recordkeeping and reporting requirements in accordance with 40 CFR Part 125.98.

Any current 316(b) requirements in the permit must remain as Best Professional Judgment requirements until inclusion of the new requirements.

Attachment I

316(b) Phase II Information Requirements

Part 122.21(r) information:

- 1) Source Water Physical Data to include:
 - a) A narrative description and scaled drawings showing the physical configuration of all source water bodies used by the facility;
 - b) Identification and characterization of the source water body hydrological and geomorphologic features;
 - c) Location maps.
- 2) Cooling Water Intake Structure Data to include:
 - a) A narrative description of the configuration and location of each cooling water intake structure;
 - b) Latitude and longitude for each cooling water intake structure;
 - c) A narrative description of the operation of each cooling water intake structure;
 - d) A flow distribution and water balance diagram that includes all sources of water to the facility;
 - e) Engineering drawings of the cooling water intake structure.
- 3) Cooling Water System Data to include:
 - a) A narrative description of the operation of the cooling water system, its relationship to cooling water intake structures, the proportion of the design intake flow that is used in the system, the number of days of the year the cooling water system is in operation and seasonal changes in the operation of the system, if applicable;
 - b) Design and engineering calculations and supporting data to support the description required above.

Part 125.95 Information; Comprehensive Demonstration Study

The purpose of the Comprehensive Demonstration Study is to characterize impingement mortality and entrainment, to describe the operation of cooling water intake structures, and to confirm that the technologies, operational measures, and/or restoration measures selected and installed or to be installed at the facility meet the applicable requirements of the rule. The permittee must specify the Compliance Alternative listed in 40 CFR Part 125.94(a) with which it intends to comply, and submit the portions of the Comprehensive Demonstration Data applicable to that alternative.

The Comprehensive Demonstration Study includes:

- 1) Proposal for Information Collection.
The permittee must submit a description of the information that will be used to support the Comprehensive Demonstration Study. Note that although an extension can be granted for submittal of the Comprehensive Demonstration Study, the Proposal for Information Collection portion must be submitted prior to the start of information collection activities, so it will be submitted in advance of the rest of the study. The proposal must include:

- a) A description of the proposed and/or implemented technologies, operational measures, and/or restoration measures to be evaluated in the Comprehensive Demonstration Study;
- b) A list and description of any historical studies characterizing impingement mortality and entrainment and/or the physical and biological conditions in the vicinity of the cooling water intake structure and their relevance to this proposed Comprehensive Demonstration Study;
- c) A summary of any past or ongoing consultations with appropriate fish and wildlife agencies that is relevant to the Comprehensive Demonstration Study;
- d) A sampling plan for any new field studies proposed to conduct in order to ensure that the permittee has sufficient data to develop a scientifically valid estimate of impingement mortality and entrainment at the site.

2) Source Water body Flow Information.

The permittee must submit the following source water body flow information:

- a) If the cooling water structure is located in a freshwater river or stream, the annual mean flow of the water body and any supporting documentation and engineering calculations to support the analysis of whether the design intake flow is greater than five percent of the mean annual flow of the river or stream for purposes of determining applicable performance standards;
- b) If the cooling water intake structure is located in a lake or reservoir and the permittee proposes to increase the design intake flow, the permittee must provide a description of the thermal stratification in the water body, and any supporting documentation and engineering calculations to show that the total design intake flow after the increase will not disrupt the natural thermal stratification and turnover pattern in a way that adversely impacts fisheries.

3) Impingement Mortality and/or Entrainment Characterization Study.

The permittee must submit an Impingement Mortality and/or Entrainment Characterization Study that provides information to support the development of a calculation baseline for evaluating impingement mortality and entrainment and to characterize current impingement mortality and entrainment. The study shall include the following:

- a) Taxonomic identification of all life stages of fish and shellfish that are in the vicinity of the cooling water intake structure(s) and are susceptible to impingement and entrainment;
- b) A characterization of all life stages of fish and shellfish including a description of the abundance and temporal and spatial characteristics in the vicinity of the cooling water intake structure(s);
- c) Documentation of the current impingement mortality and entrainment of all life stages of fish and shellfish and an estimate of impingement mortality and entrainment to be used as the calculation baseline.

4) Technology and Compliance Assessment Information.

Design and Construction Technology Plan

If the permittee has chosen to use design and construction technologies and/or operational measures, in whole or in part to meet the requirements of Part 125.94(a)(2) or (3), the permittee must submit a Design and Construction Technology Plan for review and approval. In the plan, the permittee must provide the capacity utilization rate for the facility and provide supporting data measured over a five year period (if available) of representative operating conditions and the total net capacity of the facility (in MW) and underlying calculations. The plan shall explain the technologies and/or

operational measures which are in place and/or which have been selected to meet the requirements in Part 125.94 and shall contain the following information:

- (a) A narrative description of the design and operation of all design and construction technologies and/or operational measures (existing or proposed) to reduce impingement mortality;
- (b) A narrative description of the design and operation of all design and construction technologies and/or operational measures (existing or proposed) to reduce entrainment;
- (c) Calculations of the reduction in impingement mortality and entrainment of all life stages of fish and shellfish that would be achieved by the technologies and/or operational measures that have been selected based on the Impingement mortality and/or Entrainment Characterization Study;
- (d) Design and engineering calculations, drawings, and estimates prepared by a qualified professional to support the description required by paragraphs above.

Technology Installation and Operation Plan

If the permittee has chosen the compliance alternative in Part 125.94(a)(2), (3), (4), or (5) and uses design and construction technologies and/or operational measures in whole or in part to comply with the applicable requirements of Part 125.94, the permittee must submit the following information for review and approval:

- (a) A schedule for the installation and maintenance of any new design and construction technologies;
- (b) List of operational and other parameters to be monitored, and the location and frequency that the permittee will monitor them;
- (c) List of activities that the permittee will undertake to ensure to the degree practicable the efficacy of installed design and construction technologies and operational measures, and the schedule for implementing them;
- (d) A schedule and methodology for assessing the efficacy of any installed design and construction technologies and operational measures in meeting applicable performance standards or site-specific requirements;
- (e) If the compliance alternative in Part 125.94(a)(4) is chosen, documentation that the appropriate site conditions in Part 125.99(a) or (b) exists at the facility.

5) Restoration Plan.

If the permittee proposes to use restoration measures, in whole or in part, to meet the applicable requirements of the rule, the permittee must submit the following information as part of the application for review and approval:

- a) A demonstration that the permittee has evaluated the use of design and construction technologies and/or operational measures and an explanation of how the permittee determined that restoration would be more feasible, cost-effective, or environmentally desirable;
- b) A narrative description of the design and operation of all restoration measures (existing and proposed) that the permittee has in place or will use to produce fish and shellfish;
- c) Quantification of the ecological benefits of the proposed ecological measures;
- d) Design calculations, drawings, and estimates to document that the proposed restoration measures in combination with design and construction technologies and/or operational measures, or alone, will meet the requirements of Part 125.94(c)(2);
- e) A plan utilizing an adaptive management method for implementing, maintaining, and demonstrating the efficacy of the restoration measures the permittee has selected and for determining

the extent to which the restoration measures, or the restoration measures in combination with design and construction technologies and operational measures, have met the applicable requirements of Part 125.94 (c)(2);

f) A summary of any past or ongoing consultation with appropriate fish and wildlife management agencies on permittee use of restoration measures including a copy of any written comments received as a result of such consultations;

g) If requested by DEQ, a peer review of the items that the permittee submits for the Restoration Plan;

h) A description of the information to be included in a bi-annual status report to DEQ.

6) Information to Support Site-specific Determination of Best Technology Available for Minimizing Adverse Environmental Impact.

If the permittee requested a site-specific determination of best technology available for minimizing adverse environmental impact pursuant to Part 125.94(a)(5)(i) because of costs significantly greater than those considered by EPA for a facility like the permittee's in establishing the applicable performance standards of Part 125.94(b), the permittee is required to provide the information specified in paragraphs a) and c) below. If the permittee has requested a site-specific determination of best technology available for minimizing environmental impact pursuant to Part 125.94(a)(5)(ii) because of costs significantly greater than the benefits of meeting the applicable performance standards of Part 125.94(b) at permittee's facility, the permittee shall provide the information specified in paragraphs a), b), and c) below.

a) Comprehensive Cost Evaluation Study.

The permittee must perform and submit the results of a Comprehensive Cost Evaluation Study that includes:

(1) Engineering cost estimates in sufficient detail to document the costs of implementing design and construction technologies, operational measures, and/or restoration measures at the facility that would be needed to meet the applicable performance standards of Part 125.94(b);

(2) A demonstration that the costs documented above significantly exceed either those considered by the Administrator in establishing the applicable performance standards or the benefits of meeting the applicable performance standards;

(3) Engineering cost estimates in sufficient detail to document the costs of implementing the design and construction technologies, operational measures, and/or restoration measures in permittee's Site-Specific Technology Plan developed in accordance with paragraph 6)c) below.

b) Benefits Valuation Study.

If the permittee is seeking a site-specific determination of best technology available for minimizing adverse environmental impact because of costs significantly greater than the benefits of meeting the applicable performance standards of Part 125.94(b) at the facility, the permittee must use a comprehensive methodology to fully value the impacts of impingement mortality and entrainment at the site and the benefits achievable by meeting the applicable performance standards. In addition to the valuation estimates, the benefits study shall include the following:

(1) A description of the methodology(ies) used to value commercial, recreational, and ecological benefits;

(2) Documentation of the basis for any assumptions and quantitative estimates;

(3) An analysis of the effects of significant sources of uncertainty on the results of the study;

(4) If requested by DEQ, a peer review of the items that the permittee submits in the Benefits Valuation Study;

(5) A narrative description of any non-monetized benefits that would be realized at the site if the permittee were to meet the applicable performance standards and a qualitative assessment of their magnitude and significance.

c) Site-Specific Technology Plan.

Based on the results of the Comprehensive Cost Evaluation Study and the Benefits Valuation Study, if applicable, the permittee shall submit a Site-Specific Technology Plan to DEQ for review and approval. The plan must contain the following information:

(1) A narrative description of the design and operation of all existing and proposed design and construction technologies, operational measures, and/or restoration measures that have been selected in accordance with Part 125.94(a)(5);

(2) An engineering estimate of the efficacy of the proposed and/or implemented design and construction technologies or operational measures, and/or restoration measures;

(3) A demonstration that the proposed and/or implemented design and construction technologies, operational measures, and/or restoration measures achieve an efficacy that is as close as practicable to the applicable performance standards of Part 125.94(b);

(4) Design and engineering calculations, drawings, and estimates prepared by a qualified professional to support the elements of the Plan.

7) Verification Monitoring Plan.

If the permittee complies using compliance alternatives in Parts 125.94(a)(2), (3), (4), or (5), then the permittee must submit a plan to conduct, at a minimum, two years of monitoring to verify the full-scale performance of the proposed or already implemented technologies and/or operational measures.

The verification study shall begin once the design and construction technologies and/or operational measures are installed and continue for a period of time that is sufficient to demonstrate whether the facility is meeting the applicable performance standards in Part 125.94(b) or site-specific requirements developed pursuant to Part 125.94(a)(5).

The plan shall provide the following:

a) Description of the frequency and duration of monitoring, the parameters to be monitored, and the basis for determining the parameters and the frequency and duration for monitoring;

b) A proposal on how naturally moribund fish and shellfish that enter the cooling water intake structure would be identified and taken into account in assessing success in meeting the performance standards in Part 125.94(b);

c) A description of the information to be included in a bi-annual report to DEQ.

Attachment II

Review Committee for 316(b) Proposals for Information Collection

Reviewer

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Mark Smith (DEQ Central Office will coordinate review and comment by EPA of PIC and comments from above)